

Viewpoint: What role can and should genetics play in understanding which people might become violent and commit crimes — and putting them in jail?

Nearly 2 million people, most of them Black or Latino men, are locked up in the United States. In October 2021, the National Institute of Justice, the research arm of the U.S. Department of Justice, published a [report](#) arguing that correctional officials should examine the biology of imprisoned people — their hormones, their brains, and perhaps even their genes.

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To some, such a proposal may sound invasive, even dystopian. The report’s author, Sam Houston State University biopsychosocial criminologist Danielle Boisvert, suggests it offers a chance to streamline a clunky system: By “excluding known biological and genetic factors that affect behavior,” she wrote in the report, “the criminal justice system may be suppressing its ability to fully benefit from its correctional efforts.” (Boisvert did not respond to requests for an interview.)

The DOJ report represents a new frontier in the discipline of biosocial criminology — a decades-long effort to bring biology back to the study of crime. Researchers in the field have [scanned](#) the brains of people convicted of murder and [scoured](#) the genomes of teenagers who belong to gangs. Biosocial criminology is “really a kind of smorgasbord of a lot of other disciplines, but trying to apply it to human behavior — and specifically antisocial behavior,” said J.C. Barnes, a biosocial criminologist at the University of Cincinnati.

Today, some of the nation’s top-ranked criminology programs are thriving hubs of biosocial research. Biosocial criminologists teach future prosecutors, law enforcement, and correctional officers.

But the rise of biosocial criminology has also sparked alarm among some scholars, who argue that the science is shoddy — and that racist ideas and assumptions animate the field. “The work that they’re doing is really serious, and really dangerous,” said Viviane Saleh-Hanna, a professor of crime and justice studies at UMass-Dartmouth.

Indeed, the use of biology has long divided criminologists. In the 19th and early 20th centuries, criminologists measured the skulls of imprisoned people and analyzed their bone structure. Often, they drew blatantly racist conclusions. Even as biosocial criminology grows more mainstream, it remains an open question whether the discipline can be disentangled from that racist past. A close review of the relevant literature shows that some biosocial criminologists have drawn on discredited ideas that describe Black people as inherently predisposed to crime.

Others, while steering away from writing about race, appear to largely tolerate that work. “There doesn’t seem to be a pushback against the folks who are writing about this in the field,” said Oliver Rollins, a medical sociologist at the University of Washington and the author of “Conviction: The Making and Unmaking of the Violent Brain,” a 2021 [book](#) about neuroscience and crime. “No one’s challenging these kind of racist components to the science, or the research.”

Talk with criminologists about biology, and one name comes up again and again: Cesare Lombroso. Born in 1835 in northern Italy, Lombroso trained as a physician. He soon grew fascinated with the physiology of people who had been convicted of crimes.

Lombroso dissected the corpses of people with criminal records, examined the feet of sex workers, and visited prisons to measure the dimensions of people's heads. In his 1876 book "Criminal Man," he concluded that some people were born with a predisposition to criminality — especially people he considered, without evidence, to fall lower in the evolutionary hierarchy, including southern Italians and people with African ancestry. A collection of human specimens, including 712 skulls, is now preserved in the Cesare Lombroso Museum of Criminal Anthropology in Turin. (Lombroso also asked that his own corpse, which he deemed as superior, be integrated into the collection; according to the museum's scientific director Silvano Montaldo, the criminologist's skeleton is currently on display, while his brain, as well as the soft tissues of his face, are "kept in the warehouses," in accordance with "the indications of the Italian law regarding exposures of human remains.")



Cesare Lombroso, an Italian physician and criminologist, studied the physiology of people who had been convicted of crimes. His discredited work was influential among eugenicists. *Visual: Wellcome Collection*



Lombroso requested that his own remains be integrated into his collection of human specimens. His skeleton, pictured here, is now on display at a Turin museum. *Visual: R. Goffi/Cesare Lombroso Museum of Criminal Anthropology/University of Turin*

Lombroso's work has been widely discredited. But his influence, historians say, was considerable — including among eugenicists in the early 20th century who sought to identify and eliminate strains of what they saw as degeneracy in populations. "Criminologists consider it edifying to believe that a man can be saved by grace, but refuse to admit that he can be damned by germ plasm," the American eugenicist Earnest Hooton complained in 1932, reporting on the results of a study of 16,000 incarcerated people. His conclusion: Biology mattered. "I am beginning to suspect that Lombroso, like Darwin, was right," he wrote.

By the late 20th century, that legacy had left many criminologists hesitant to engage with biology. Still, amid advances in genetics and brain imaging, some scholars called for the field to explore a potential connection between biology and crime.

Among them was Anthony Walsh. A former police officer, Walsh entered graduate school in his mid-30s, moonlighting as a probation and parole officer to support his young family. By 1984, he was an assistant professor of criminal justice at Boise State University, preparing students for careers in the criminal justice

system. His early research mostly examined sentencing guidelines and the probation process.

Over time, though, Walsh grew frustrated with his colleagues. He thought they spent too much time focusing on the social causes of crime. “Everything and everybody was accountable for the crime, except the guy who committed it,” he told Undark in a 2022 interview. In particular, Walsh wondered if fields like genetics and evolutionary biology could help explain why some people offend, and others do not.

Those kinds of inquiries could face backlash. For example, in 1992, the National Institutes of Health agreed to fund a conference on genetics and crime. The federal science agency later withdrew the funding after an uproar, fueled by revelations that a key organizer had once seemingly [compared](#) Black urban neighborhoods to jungles. Critics worried that genetics would become a high-tech tool for racial profiling.

Criminologists like Walsh did little to dispel such fears. In 1997, he and a colleague, Lee Ellis, drew on the speculative theories of a white-supremacist aligned psychologist to suggest that White people had evolved to be less violent than Black people, and that biology could explain why more Black people than White people end up imprisoned.

To most crime researchers, those claims have serious problems. Decades of research — in many disciplines — have documented how generations of racism, disenfranchisement, and uneven policing disproportionately direct Black people, poor people, and other marginalized groups into the criminal justice system.

At the same time, experts in human evolution say, biology is a terrible tool for explaining these kinds of racial disparities. For one thing, racial categories are just rough [attempts](#) to describe the biological variation among human beings, rather than fixed, coherent categories of people who have evolved along different trajectories. For another, even if scientists can sometimes identify average genetic differences among socially defined groups, those differences tend to be very slight — and have no obvious link to a complex social phenomenon like violent behavior.



A museum exhibit depicting Lombroso's private office, including a portrait of the criminologist painted after his death. Lombroso's work led him to the conclusion that some people were born with a predisposition to criminality — especially people he considered, without evidence, to fall lower in the evolutionary hierarchy. Visual: R. Goffi/Cesare Lombroso Museum of Criminal Anthropology/University of Turin

It's "just kind of fascinating that we would presume that there is something that's so simplistic about complex behaviors, that it could map on to something like skin color in a fairly straightforward way," said Deborah Bolnick, an expert in human evolution and genetics at the University of Connecticut.

Despite such concerns, Walsh and his co-author [published](#) their theory in the field's flagship journal, *Criminology*. And Walsh soon found himself gaining new colleagues who were interested in biology and crime. Starting in the late 1990s, a growing number of criminologists turned to biology, aiming to integrate genetics, neuroscience, and sociology to produce more robust theories of crime. Some feared they would face professional repercussions for doing so. "My mentor, when I told him what I was doing, was like, 'John, don't do this,'" said John Paul Wright, a criminologist at the University of Cincinnati and an early proponent of using genetics to study crime. "He was worried about the consequences for my career."

Wright and others called the emerging discipline biosocial criminology — a rebranding that was complete by 2009, when Walsh and a colleague edited a [book](#), “Biosocial Criminology,” featuring essays from leading scholars in the young field. (Boisvert, the author of the DOJ report, contributed to a chapter.) A preface, written by another Cincinnati criminologist, Francis T. Cullen, acknowledged the discipline’s troubled history. Biosocial criminologists, he wrote, “will have to show how the new paradigm rejects its repressive heritage.”

Not everyone was convinced that biosocial criminology was so different from its predecessors.

Saleh-Hanna, the UMass-Dartmouth professor, began attending the annual American Society of Criminologists conference in the 1990s, as a student. She soon gravitated towards panels on biology and crime.

At these sessions, Saleh-Hanna sat in the back. She took notes. She rarely spoke. Usually, she said, she was the only Black person — in fact, the only person of color — in the room. “I always felt like I had a responsibility to my own communities to go and listen,” Saleh-Hanna told Undark. “I always knew that they were talking about us.”

The basic process described at the conference, Saleh-Hanna said, felt like a throwback to Lombroso: Scientists looked at the bodies of poor, marginalized people, isolated some biological characteristic, and used it to suggest that those people were inferior or dangerous. “They’re still doing that same work,” Saleh-Hanna said, “but they’re using this new scientific language.”

Saleh-Hanna has sometimes brought a Black colleague, Montclair State University criminologist Jason Williams, to the presentations. He said the sessions often involve all-White academic panels commenting on the biology of people who had been accused of crimes. “Here you are sitting up here on this panel, and you’re generalizing largely people of color, but then also poor Whites,” Williams said. “Anybody who’s really powerless, I think, gets the lower end of the stick with those theories, in those studies.”

Indeed, biosocial criminologists have sometimes used new techniques to circle back to an old conclusion: that biology can help explain why the criminal justice system locks up so many people of color. There’s scant scientific evidence to support that claim. Still, in the same 2009 volume in which Cullen urged the field to reject “its repressive heritage,” his University of Cincinnati colleague, Wright, wrote a chapter arguing that biological differences among racial groups explain disparities in crime.

Portions of the field would go on to celebrate those ideas: Despite Walsh’s ongoing writing about race and crime, the Biosocial Criminology Association honored him with its lifetime achievement award in 2014, citing his “invaluable impact on our current understanding of why people commit crime and delinquency.”

In 2015, six criminologists, several teaching at large public universities, [published](#) a sweeping “unified crime theory” in *Aggression and Violent Behavior*, a peer-reviewed criminology journal put out by scientific publisher Elsevier. In the paper, they draw heavily on the work of the late J. Philippe Rushton, a professor

of psychology at the University of Western Ontario. Now largely discredited by the scientific community, Rushton spent much of his career arguing that White people have evolved to be smarter, more altruistic, and less violent than Black people. Twisting a theory from ecology, Rushton also argued that some racial groups have evolved to be more fertile — but, in a kind of tradeoff, have also evolved to be more aggressive, less able to exercise self-control, and less intelligent.

Many scientists now [describe](#) Rushton's work as incoherent, riddled with errors, and blatantly racist; his own university eventually disavowed him. The theory is “pulp science fiction” that’s “draped in the lingo of evolutionary theory,” Yale University ecology and evolutionary biology assistant professor C. Brandon Ogbunu [wrote](#) in a recent essay for Undark.



Reporters and protesters surround psychology professor J. Philippe Rushton at the University of Western Ontario after a lecture in 1991. Biosocial criminologists have drawn on Rushton's blatantly racist work for years. Visual: Victor Aziz/Toronto Star via Getty Images

Bolnick, the Connecticut researcher, said that Rushton's theory treats humans as "reproductive machines," in a way that doesn't really reflect how people live. "It doesn't map onto the way any human societies operate, or any families operate," she said. And Rushton and his acolytes also selectively apply the theory, she said, in ways that mostly just repackage old stereotypes: For example, they spend little time considering the large families of White settlers in the 19th century U.S.

Still, for years, Rushton's work was cited in the biosocial criminology literature. In the 2015 paper, the researchers drew on Rushton to speculate that this evolutionary path could help explain racial disparities in convictions.

Later that year, the lead author of the paper, Brian Boutwell, took to the right-wing magazine *Quillette* to complain that biosocial criminologists were being [shunned](#) by their colleagues. Around that time, Boutwell and one of his co-authors on the paper, Florida State University criminologist Kevin Beaver, appeared separately on the show of alt-right podcaster Stefan Molyneux to talk about the links between crime, biology, and race. (Wright, one of the Cincinnati professors, appeared on the show too.)

Shunned or not, the authors of the paper maintained active careers. Boutwell is now an associate professor at the University of Mississippi. One of his co-authors, J.C. Barnes, was until recently the chair of the Biopsychosocial Criminology division of the American Society of Criminology. Another co-author, Beaver, now directs the Biosocial Criminology Research & Policy Institute at Florida State University, and he maintains an affiliation with King Abdulaziz University in Saudi Arabia. (Beaver did not respond to requests for an interview.)

Many biosocial criminologists are skeptical of such work on race, and worry it will hamper their efforts to gain broader acceptance for their techniques, according to Julien Larregue, a sociologist at Université Laval in Quebec who has studied the field. But, he noted, that criticism is mostly informal: "If you look at publications, I don't find a lot of pushback."

In the broader field of criminology, though, some experts have raised questions about certain methods that biosocial researchers use. In particular, some have questioned efforts to draw a line from specific genes to criminality or antisocial behavior.

One of the most persistent critics has been Callie Burt, an associate professor at Georgia State University. Around 10 years ago, Burt was asked to review a paper examining genetics and crime. Trained in sociology, she quickly realized she didn't have the tools to follow the argument. Undeterred, Burt dove into the genetics literature. "I've learned that we know a lot more about genetics than I realized," she said. "But the more we learn, the more complicated things are."

Burt had plenty to catch up on. The first sequencing of the full human genome, completed in 2000, was accompanied by a wave of new research aiming to tie specific genes to specific outcomes. Biosocial criminologists embraced that work. In the 2000s, some gravitated toward a then-trendy method called a candidate gene study, in which researchers look at whether a specific gene may be linked to certain traits. Some focused on a hypothesized link between violent behavior and a gene called MAOA. ("Gangsta Gene' Identified in U.S. Teens" read one 2009 [headline](#) from ABC News, reporting on work by Beaver and

colleagues.) But subsequent research has cast doubt on most candidate gene studies, including those purporting a connection between MAOA and violence. “That finding’s not in great shape,” said Michael “Doc” Edge, a population geneticist at the University of Southern California.

Recently, some biosocial criminologists, including Boutwell and Barnes, have been joining with behavioral geneticists and other scientists on genome wide association studies, or GWAS (pronounced GEE-wahs). The technique, pioneered in the past two decades, scans vast databases of genetic data, looking for correlations between particular genes and certain outcomes, such as height, IQ, or college graduation.

Burt and others argue that even these high-powered new studies rest on some misguided assumptions. Like many other experts, she’s skeptical that it’s possible to disentangle nature and nurture so neatly — in part because the categories of crime and antisocial behavior are themselves so slippery.

The problem, according to Burt and other experts, is that crime and antisocial behavior aren’t straightforward, easy-to-measure traits. Rather, these behaviors are socially constructed and highly variable. Something that’s a crime in one state — such as smoking pot — may be legal one state over. An aggressive action — such as punching someone repeatedly until they lose consciousness — may be celebrated in one context (a boxing ring) and illegal in another (a bar). And two people can be treated very differently for doing the exact same thing: Research [suggests](#) that Black elementary school children, for example, are [likelier to receive](#) disciplinary action than White children, independent of their actual behavior. And [studies](#) often find that Black adults who use drugs are likelier to be arrested and incarcerated than White adults who use drugs.

“We behave in context,” Burt said. She brought up an example: People who have “biological propensities — and I can agree that we have different ones — that might lead to impulsivity or risk-taking or even selfishness and disregard for other people, sort of predatory activities.” In an affluent environment, Burt said, someone with those traits may end up flourishing: They go to Wall Street, where their predatory behaviors lead to large paychecks. Meanwhile, “someone growing in inner city, with not those opportunities,” she added, “may end up engaging in predatory behaviors that are criminalized.”

Burt and other critics say that biosocial accounts of crime just don’t fully account for this complexity. A study linking, say, high testosterone levels with felonies runs the risk of implying that testosterone levels are immutable — and that felonies are somehow a set natural property, like the height of a person or the length of a day, rather than a contingent and shifting target.

Saleh-Hanna sees that as a fundamental problem in the field, one going all the way back to Lombroso. “He created this impression, that we still struggle with every day in this society, this impression that crime can be objectively scientifically defined external to the human perception,” she said. As a consequence, she added, “these notions of crime and criminality continue to be seen as natural parts of human societies.”

Certain biases, scholars say, also shape which kinds of crimes end up under the scrutiny of biological methods — and which do not. “We don’t have a notion that crimes of finance are explained by biology,” said Troy Duster, an emeritus professor of sociology at UC Berkeley. “‘Let’s take the DNA samples of the people who were involved in the Enron scandal’ — no one suggested that.” It’s only when Black, Brown, and poor White people are involved, Duster and other scholars suggest, that criminologists start to turn to biology to understand what might have gone wrong.

Recently, some genetics researchers have tried to address some of these concerns by broadening their target to “antisocial behavior” — a catchall category that can include criminal conviction, but also things like personality test results and behavior in school, although these, too, come with their own biases.

In 2013 Jorim Tielbeek, at the time a geneticist and crime scholar at VU Medical Center Amsterdam, founded the Broad Antisocial Behavior Consortium, or BroadABC, a global network of scholars who hope to uncover some of the genes associated with antisocial behaviors. (The group’s first [paper](#), published in 2017, briefly cites some of Boutwell and his colleagues’ work involving Rushton.) In late October, the consortium published their most recent [study](#), which draws on genetic data from more than 85,000 people.

How much that kind of research can explain remains disputed. For all the power of new tools like GWAS, some geneticists say, they have only highlighted how incredibly complex the relationship is between genes and their environment.

The process, these experts say, is even harder when studying a complicated social outcome like a criminal conviction. Eric Turkheimer, a behavior geneticist at the University of Virginia known for his skeptical takes, told Undark that he would be surprised if such approaches could account for even 1 percent of the variance among something like criminality, once researchers control for confounding factors. “And if that’s true,” he asked, “what good is it?”

Some biosocial criminologists say those sorts of concerns have pushed them to reconsider elements of their work. Boutwell, the University of Mississippi professor, said he has revised his thinking. “I think our sociological colleagues make a stronger case when they talk about the historical cultural factors that have underpinned the disparities that we see,” he said, adding that he no longer stands behind his previous work on race.

One of his collaborators, Barnes, also described changing his approach. Barnes grew up in South Carolina; his stepfather and two siblings work in law enforcement. As a graduate student, he studied with Kevin Beaver at Florida State; a senior scholar in the field described him, in an email, as “possibly the most articulate leader of the younger generation.” In an interview with Undark, Barnes said reading the work of Turkheimer and the behavioral geneticist Kathryn Paige Harden had pushed him to take a far more cautious approach to making claims about genetics and crime. He pointed to a more recent, [measured paper](#) on genetics and crime that he wrote in 2018. That paper calls on biosocial researchers to pay close attention to social and environmental factors, rather than focusing on genes in isolation. Still, the paper suggests that genetics could say something meaningful about why the criminal justice system

incarcerates so many people of color. “The amount of time and care I put into that article,” he said, “is where I wanted things to be focused from there forward.”

Barnes said he’s grown more cautious in drawing conclusions about the complicated factors that drive people to crime. “It’s clear our genetic and biological makeup have an impact on our behavior,” Barnes said. “But can we get much more specific than that? I don’t think we can at this point.”

At least some criminologists have found themselves in a kind of gray area — at once skeptical of certain biosocial explanations of crime, but still open to the idea that biology plays some role in understanding violence and transgression.

When the criminologist Michael Rocque was in graduate school, he worked closely with the late Nicole Hahn Rafter, a feminist criminologist who devoted much of her career to studying Lombroso’s grim legacy, including his influence on the American eugenics movement. Working with Rafter, Rocque said in a recent interview, had an unexpected effect: It pushed him to consider how biology could still be used to responsibly to think about crime.

Today, Rocque is an associate professor at Bates College, and he has published studies documenting how bias affects the disciplinary action faced by young Black students. He’s also a co-author, with Barnes and another colleague, of a recent book on biopsychosocial criminology, and he occasionally uses biosocial methods in his work. “I have just read too much empirical research, and seen too much evidence that genes do matter,” he said. “They’re part of the story when it comes to understanding and explaining criminal behavior.”

Still, he cautioned, studies of things like genetics or neuroscience in crime often remain tentative — and not ready for applied use now. And if they ever are ready for applied use, he said, there will have to be protections in place to make sure their use is beneficial. “In my view, we’re not at the stage where any of this stuff can be put into practice in a responsible way,” said Rocque.

That hasn’t stopped some researchers from exploring potential applications. In fall 2021, the National Institute of Justice held an online symposium to announce a new volume on the study of people who desist from crime. “This volume is a significant achievement in the field of criminal justice research,” said [Amy Solomon](#), a senior Department of Justice official appointed by Attorney General Merrick Garland, in introductory remarks.

Included in the volume was the 2021 report by Danielle Boisvert, the Sam Houston State criminologist. (Rocque also contributed a chapter.) In a presentation during the session, Boisvert discussed some of the many tools that a biologically-informed correctional system might use. At times, those tools seemed to blur the line between corrections and medical care: For example, Boisvert argued that neuropsychological and physiological testing could help identify developmental issues in incarcerated people, and allow them to receive appropriate care. Such testing could potentially help prisons better evaluate whether or not someone is likely to end up incarcerated again. In some cases, she argued, they may even make a case for keeping a person out of prison altogether.

Afterward, a DOJ staffer posed a question to Boisvert: How could these techniques avoid “condemning people from birth based on their biological characteristics?” Boisvert called for programs that focus on the way the environment manifests in the body — “trauma, abuse, neglect, substance use, traumatic brain injury, lead exposure” — rather than on people’s genes.

“There are other noninvasive low-cost ways that we can incorporate biological factors into assessments,” she said, “that don’t rely on DNA.”

Many experts remain skeptical that such interventions could ever do much to fix a criminal justice system they describe as systemically racist and deeply broken. “If you’re only making that system more efficient, then racism will continue to exist,” said Rollins, the University of Washington sociologist. Things like neurobiological models of crime, he said, aren’t able to address such fundamental problems.

“The only thing that they can really do,” he added, “is reinforce what’s already there.”

Michael Schulson is a contributing editor for Undark. His work has also been published by Aeon, NPR, Pacific Standard, Scientific American, Slate, and Wired, among other publications.

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